

What is claimed is:

1. A semiconductor device comprising:

a first insulating film formed over a semiconductor substrate;

5 a capacitor formed on the first insulating film and having a lower electrode, a dielectric film, and an upper electrode;

a second insulating film formed over the capacitor and the first insulating film; and

10 a metal pattern formed on the second insulating film over the capacitor and a periphery thereof, and having a stress in an opposite direction to a stress of the second insulating film.

2. A semiconductor device according to claim 1,
15 wherein metal wiring patterns are formed in the second insulating film.

3. A semiconductor device comprising:

a first insulating film formed over a semiconductor substrate;

20 a capacitor formed on the first insulating film and having a lower electrode, a dielectric film, and an upper electrode;

a second insulating film formed over the capacitor and the first insulating film;

25 a recess formed in the second insulating film over the capacitor and a periphery thereof; and

a metal pattern formed in the recess and having a

stress in an opposite direction to a stress of the second insulating film.

4. A semiconductor device according to claim 1, wherein a potential of the metal pattern is a fixed potential or a floating potential.

5. A semiconductor device according to claim 1, wherein the capacitor is formed in plural in a cell region, and the metal pattern covers an entirety of the cell region.

6. A semiconductor device according to claim 5, wherein the metal pattern is formed wider than the cell region.

7. A semiconductor device according to claim 1, wherein the stress of the metal pattern is a tensile stress.

8. A semiconductor device according to claim 1, wherein the metal pattern is formed to have a single-layer structure or a multi-layered structure.

9. A semiconductor device according to claim 1, wherein the metal pattern is made of any material selected from the group consisting of aluminum, titanium, copper, tantalum, and tungsten, or made of material containing any one selected from the group consisting of aluminum, titanium, copper, tantalum, and tungsten.

10. A manufacturing method of semiconductor device comprising:

forming a first insulating film over a semiconductor substrate;

forming capacitors, each having a lower electrode, a

dielectric film, and an upper electrode, on the first insulating film in a cell region;

forming a second insulating film over the capacitors and the first insulating film;

5 forming a metal film on the second insulating film;

forming a metal pattern, which covers the cell region, by patterning the metal film; and

heating the metal film at a melting point or less of the metal film before or after the formation of the metal pattern, to change a stress of the metal film.

10 11. A method according to claim 10 further comprising:

forming a metal wiring in a region, which is away from the metal pattern, by patterning the metal film.

15 12. A method according to claim 10, wherein the second insulating film is a film that is formed by using a reaction gas containing TEOS.

13. A manufacturing method of semiconductor device comprising:

20 forming a first insulating film over a semiconductor substrate;

forming capacitors, each having a lower electrode, a dielectric film, and an upper electrode, on the first insulating film in a cell region;

25 forming a second insulating film over the capacitor and the first insulating film;

forming a recess, which covers the cell region, in

the second insulating film;

forming a metal film, which has a thickness of burying the recess, in the recess and on an upper surface of the second insulating film;

5 removing the metal film from the upper surface of the second insulating film and also leaving the metal film in the recess as a metal pattern; and

heating the metal film at a melting point or less of the metal film before or after the formation of the metal
10 pattern, to change a stress of the metal film.

14. A method according to claim 13, wherein the second insulating film is formed of a laminated film consisting of a plurality of insulating films, and at least one layer of the laminated film is a film that is formed by
15 using a reaction gas containing TEOS.

15. A method according to claim 10, wherein heating of the metal film is executed in a reduced-pressure atmosphere.

16. A method according to claim 10, wherein heating
20 of the metal film is executed in any one of an oxygen atmosphere, an oxygen containing atmosphere, an inert gas atmosphere, and an inert gas containing atmosphere.

17. A method according to claim 10 further comprising:

25 forming a third insulating film on the metal film before heating the metal film.

18. A method according to claim 10, wherein formation

of the metal pattern is formation of a film that is made of any one of material selected from the group consisting of aluminum, titanium, copper, tantalum, and tungsten, or made of material containing any one selected from the group
5 consisting of aluminum, titanium, copper, tantalum, and tungsten.

19. A method according to claim 10, wherein the stress of the metal film is changed into a stress, which is opposite to a stress of the second insulating film, by
10 heating the metal film.

20. A method according to claim 19, wherein the stress of the metal film is changed into a tensile stress by heating the metal film.

21. A method according to claim 10, wherein the
15 second insulating film has a compressive stress.

22. A method according to claim 10, wherein the metal film is formed to have a single-layer structure or a multi-layered structure.